FTD-HT-67-111

FOREIGN TECHNOLOGY DIVISION

DESCRIPTIONS OF INVENTIONS

(A COLLECTION OF SOVIET PATENTS)

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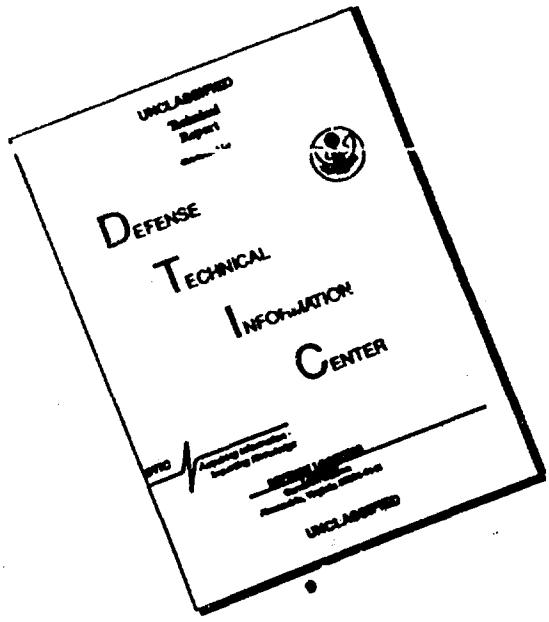

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FTD-HT- 67-111

UNEDITED ROUGH DRAFT TRANSLATION

DESCRIPTIONS OF INVENTIONS

(A COLLECTION OF SOVIET PATENTS)

English pages: 37

Translated under: Contract AF33(657)-16408

TA8000921, TA700157?-1588

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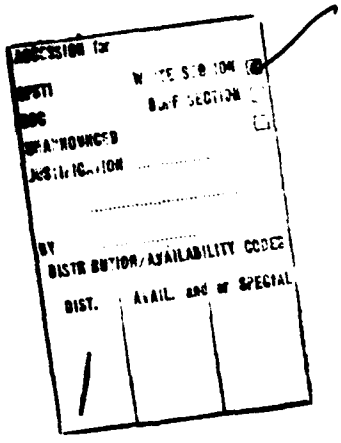

This translation was made to provide the users with the basic essentials of the original document in the shortest possible time. It has not been edited to refine or improve the grammatical accuracy, syntax or technical terminology.

DATA HANDLING PAGE

01-ACCESSION NO.	98-DOCUMENT LOC	39-TOPIC TAGS
TA8000921		electric generator, gas, electricity

09-TITLE: A CAPACITIVE PNEUMOELECTRIC ALTERNATING-CURRENT GENERATOR

47-SUBJECT AREA: 10

42-AUTHOR/CO-AUTHORS	10-DATE OF INFO
GOLOVKO, A. F.	24JUN65
43-SOURCE	**66-DOCUMENT NO.**
PATENT 182219 (1014691/26-25) CLASS 21d^2, 5/01 (RUSSIAN)	HT6700111(a)
	69-PROJECT NO. 11705-78

63-SECURITY AND DOWNGRADING INFORMATION	64-CONTROL MARKINGS	97-HEADER CLASN
UNCL, 0	NONE	UNCL

76-REEL/FRAME NO.	77-SUPERSEDES	78-CHANGES	40-GEOGRAPHICAL AREA	NO. OF PAGES
1882 2065			UR	4
CONTRACT NO.	**X REF ACC. NO.**	**PUBLISHING DATE**	**TYPE PRODUCT**	**REVISION FREQ**
	AP6021436		Translation	None

STEP NO.: UR /0000/00/000/000/0001/0003

ACCESSION NO.: TA7001578

ABSTRACT:

An electropneumatic a-c generator of the capacitor type is introduced in which the energy of a compressed gas is converted into electricity by mechanically varying relative capacitances between the individual oppositely charged parts of the machine. To increase the use of the compressed gas energy, the generator is designed in the form of longitudinal channels with a rectangular cross section made of fixed insulated plates. The movable part consists of insulated strips placed inside the channels and performs TW-type motions under the action of gas pulses. Self-oscillating reed gas distributors, due to the action of aerodynamic forces, are mounted at the inlet to the channels.

Orig. art. has: 4 figures.

DATA HANDLING PAGE

01-ACCESSION NO.	02-DOCUMENT LOC	03-TOPIC TAGS
TA7001579		electronic circuit, logic circuit, transistorized circuit

04-TITLE
A TERNARY LOGIC CIRCUIT

07-SUBJECT AREA
09

05-AUTHOR/CO-AUTHORS	10-DATE OF INFO
IVAS'KIV, YU. L.; IL'INYKH, A. S.	06NOV64
06-SOURCE	**08-DOCUMENT NO.**
PATENT 182402 (928192/26-24) CLASS 42m, 14/02 (RUSSIAN)	HT6700111(b)
	09-PROJECT NO. 11705-78

63-SECURITY AND DOWNGRADING INFORMATION	64-CONTROL MARKINGS	97-HEADER CLASN
UNCL, 0	NONE	UNCL

76-REEL/FRAME NO.	77-SUPERSEDES	78-CHANGES	40-GEOGRAPHICAL AREA	NO. OF PAGES
1882 2066			UR	5
CONTRACT NO.	**X REF ACC. NO.**	**PUBLISHING DATE**	**TYPE PRODUCT**	**REVISION FREQ**
	AP6021474		Translation	None

STEP NO.	ACCESSION NO.
UR/0000/00/000/000/0001/0004	TA7001579

ABSTRACT: A ternary logical circuit using transistors with different conductance and with grounded emitters is introduced. The base-emitter function serves as the input of the circuit to which two series-connected tunnel diodes are coupled.
Orig. art. has: 2 figures.

DATA HANDLING PAGE

01-ACCESSION NO.	02-DOCUMENT LOC	03-TOPIC TAGS
TA7001580		analog digital converter, electronic feedback, pulse amplitude

05-TITLE
AN ANALOG-TO-DIGITAL CONVERTER

07-SUBJECT AREA
09

08-AUTHOR/CO-AUTHORS	10-DATE OF INFO
KISETS, D. KH.; IVANOV, V. I.	16DEC64

12-SOURCE	66-DOCUMENT NO.
PATENT 182407 (933419/26-24) CLASS 42m, 14/03 (RUSSIAN)	HT6700111(c)
	69-PROJECT NO. 11705-78

63-SECURITY AND DOWNGRADING INFORMATION	64-CONTROL MARKINGS	97-HEADER CLASN
UNCL, 0	NONE	UNCL

76-REEL/FRAME NO.	77-SUPERSEDES	78-CHANGES	40-GEOGRAPHICAL AREA	NO. OF PAGES
1882 2067			UR	4

CONTRACT NO.	X REF ACC. NO.	PUBLISHING DATE	TYPE PRODUCT	REVISION FREQ
	AP6021475		Translation	None

STEP NO.	ACCESSION NO.
UR/0000/00/000/000/0001/0002	TA7001580

ABSTRACT: An analog-to-digital converter containing a nonlinear two-terminal network, such as a reverse-biased diode or a triode operating as a diode, with a capacitive feedback is introduced. To simplify the circuit, a linear amplifier is coupled as a load to the two-terminal network. The input of the amplifier is connected to a voltage source, while its output is connected to the common point between the capacitance and the two-terminal network.
Orig. art. has: 1 figure.

DATA HANDLING PAGE

01-ACCESSION NO.	02-DOCUMENT LOC	03-TOPIC TAGS
TA7001581		relaxation oscillator, pulse transformer, frequency stability

04-TITLE A RELAXATION OSCILLATOR WITH AN LC RESONANT CIRCUIT

05-SUBJECT AREA
17

06-AUTHOR/CO-AUTHORS	10-DATE OF INFO
NEZHDANOV, I. V.; MOIN, V. S.	19MAY64

07-SOURCE	08-DOCUMENT NO.
PATENT 182766 (900982/26-9) CLASS 21a[1], 36/02 (RUSSIAN)	HT6700111(d)
	09-PROJECT NO. 11705-78

63-SECURITY AND DOWNGRADING INFORMATION	64-CONTROL MARKINGS	97-HEADER CLASN
UNCL, 0	NONE	UNCL

76-REEL/FRAME NO.	77-SUPERSEDES	78-CHANGES	40-GEOGRAPHICAL AREA	NO. OF PAGES
1882 2068			UR	3

CONTRACT NO.	X REF ACC. NO.	PUBLISHING DATE	TYPE PRODUCT	REVISION FREQ
	AP6021783		Translation	None

STEP NO.	ACCESSION NO.
UR/0000/00/000/000/0001/0002	TA7001581

ABSTRACT: A relaxation oscillator circuit with an LC-tank, thyristor, diode, and a pulse transformer is introduced. The primary winding of the pulse transformer is connected in series with the resonant LC circuit, while the secondary winding is joined to the thyristor control electrode. This increases frequency stability and output power of the generated pulses. A more reliabile circuit may be formed if additional thyristors are used. These may be controlled by separate secondary windings of the pulse transformer as shown in the lower circuit. Orig. art. has: 2 figures.

DATA HANDLING PAGE

01-ACCESSION NO.	98-DOCUMENT LOC	39-TOPIC TAGS
TA7001582		pulse shaper, current stabilization

00-TITLE
A PULSE STRETCHER

47-SUBJECT AREA
09, 17

42-AUTHOR/CO-AUTHORS
MAGRACHEV, Z. V.; TSYGANKOV, B. K.; YEGUPOV, [illegible] YA.

10-DATE OF INFO
06SEP65

43-SOURCE
PATENT 182767 (1036237/26-9) CLASS 21a[1], 36/04; 21a[4],71 (RUSSIAN)

68-DOCUMENT NO.
HT6700111(e)

69-PROJECT NO.
11705-78

63-SECURITY AND DOWNGRADING INFORMATION	64-CONTROL MARKINGS	97-HEADER CLASN
UNCL, 0	NONE	UNCL

76-REEL/FRAME NO.	77-SUPERSEDES	78-CHANGES	40-GEOGRAPHICAL AREA	NO. OF PAGES
1882 2069			UR	4

CONTRACT NO.	X REF ACC. NO.	PUBLISHING DATE	TYPE PRODUCT	REVISION FREQ
	AP6021784		Translation	None

STEP NO.	ACCESSION NO.
UR/0000/00/000/000/0001/0002	TA7001582

ABSTRACT: A pulse stretching circuit for use in digital pulse duration measurements is shown. It consists of a regulated charging current source which drives an integrating capacitor (3) through a diode. The capacitor (3) is connected to the diode cathode, regulated discharge current source, and a comparator. To insure operation of the circuit in the same mode in all measurement ranges, additional capacitors may be switched into the circuit by a range switch.
Orig. art. has: 1 figure.

DATA HANDLING PAGE

01-ACCESSION NO.	02-DOCUMENT LOC	03-TOPIC TAGS
TA7001583		pipeline, hermetic seal

00-TITLE DEVICE FOR HERMETIC JOINING OF TWO PIPES

07-SUBJECT AREA
13

08-AUTHOR/CO-AUTHORS	10-DATE OF INFO
AKHROMEYEV, ZH. P.; NYRKOV, V. I.	27MAY64
05-SOURCE	**06-DOCUMENT NO.**
PATENT [illegible] CLASS 47f, 1[illegible] (RUSSIAN)	HTe700111(N)
	09-PROJECT NO.
	11705-7[illegible]

03-SECURITY AND DOWNGRADING INFORMATION	04-CONTROL MARKINGS	97-HEADER CLASN
UNCL, 0	NONE	UNCL

76-REEL/FRAME NO.	77-SUPERSEDES	78-CHANGES	40-GEOGRAPHICAL AREA	NO. OF PAGE
1882 [illegible]			UR	3
CONTRACT NO.	**X REF ACC. NO.**	**PUBLISHING DATE**	**TYPE PRODUCT**	**REVISION FREQ**
	AP6021524		Translation	None

STEP NO. UR/0000/65/[illegible]/000/0001/0002

ACCESSION NO. TA7001583

ABSTRACT: An Author Certificate has been issued for a device for joining two pipelines hermetically, which is made in the form of nipples fastened to the pipelines and outfitted with built-in shut-off valves having springs for closing off the pipelines when disassembled and connected with each other by a swing nut. To relieve internal pressure on the thread, one of the nipples has a pressure-release chamber, which is enclosed by a cylinder and a shut-off valve rod coaxial to the nipple housing. To assure the nipples' hermetic seal, in the shut-off valves are W-shaped grooves containing vulcanized rubber.
Orig. art. has: 1 figure.

Fig. 1. Device for the hermetic joining of two pipelines.

1 - Nipples; 2 - hermetic chamber; 3 - cylinder; 4 - shut-off valve rod.

DATA HANDLING PAGE

01-ACCESSION NO.	98-DOCUMENT LOC	38-TOPIC TAGS
TA7001584		gyroscope, resonator, laser, quartz

05-TITLE
A LASER GYROSCOPE WITH QUARTZ RESONATOR

47-SUBJECT AREA
20, 17

42-AUTHOR/CO-AUTHORS	10-DATE OF INFO
SLASHCHIN, M. S.; KUZ'MIN, YE. I.	23MAR64
43-SOURCE	**68-DOCUMENT NO.**
PATENT 172400 (891000/26-25) CLASS 21f, 90; 42c, 38 (RUSSIAN)	HT6700111(g)
	69-PROJECT NO. 60502-01

63-SECURITY AND DOWNGRADING INFORMATION	64-CONTROL MARKINGS	97-HEADER CLASN
UNCL, 0	NONE	UNCL

76-REEL/FRAME NO.	77-SUPERSEDES	78-CHANGES	40-GEOGRAPHICAL AREA	NO. OF PAGES
1382 2071			UR	2
CONTRACT NO.	**X REF ACC. NO.**	**PUBLISHING DATE**	**TYPE PRODUCT**	**REVISION FREQ**
	AP5021570		Translation	None

STEP NO.	ACCESSION NO.
UR/0000/00/000/000/0001/0002	TA7001584

ABSTRACT: This author certificate introduces a laser gyroscope (see Fig. 1) containing a resonator composed of two joined quartz plates with quartz mirrors glued on them. This type of resonator assures the rigidity of the laser gyroscopes.
Orig. art. has: 1 figure.

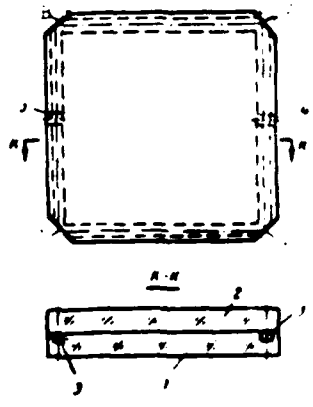

Fig. 1. Laser gyroscope with quartz resonator

A, B, C, and D - Mirrors;
1 and 2 - quartz plates;
3 - resonator; 4 and 5 - openings in the plates.

DATA HANDLING PAGE

01-ACCESSION NO.	02-DOCUMENT LOC	03-TOPIC TAGS
TA7001585		simulation, aerodynamic load, aileron, static test

00-TITLE DEVICE FOR SIMULATION OF AERODYNAMIC LOAD ON COMPONENTS OF AN AIRCRAFT

47-SUBJECT AREA
01, 13

42-AUTHOR/CO-AUTHORS
KULEPOV, V. K.; GUSEV, A. G.; ALTUKHOV, V.D.; *

10-DATE OF INFO
16JUL64

45-SOURCE
PATENT 171613 (912266/40-23) CL/33 42k, 21.1 (RUSSIAN)

68-DOCUMENT NO.
HT6700111(h)

69-PROJECT NO.
11705-70

63-SECURITY AND DOWNGRADING INFORMATION	64-CONTROL MARKINGS	97-HEADER CLASN
UNCL, 0	NONE	UNCL

76-REEL/FRAME NO.	77-SUPERSEDES	78-CHANGES	40-GEOGRAPHICAL AREA	NO. OF PAGES
1382 2072			UR	3

CONTRACT NO.	X REF ACC. NO.	PUBLISHING DATE	TYPE PRODUCT	REVISION FREQ
			Translation	None

STEP NO.	ACCESSION NO.
UR /0000/00/000/000/0001/0002	TA7001585

ABSTRACT:

* 42 - Author/co-authors - cont. KULEPOV, M. A.; MAMONOV, B.I.

Invention proposes a device for simulation of aerodynamic load on components of an aircraft, usually control surfaces, ailerons, and landing gear doors. The device consists of a frame with drums and suspension assemblies and a loading system with a cylinder, beam, ropes and straps. The axis of the frame suspension elements coincides with the rotation axis of the object being tested. The frame of the loading strap system is attached to the test object, and the cables run over drums to the beam and loading cylinder.

DATA HANDLING PAGE

01-ACCESSION NO.	98-DOCUMENT LOC	39-TOPIC TAGS
TA7001586		wind tunnel, Mach number, boundary layer flow

09-TITLE
AN ADJUSTABLE WIND-TUNNEL NOZZLE

07-SUBJECT AREA
01

42-AUTHOR/CO-AUTHORS
SOLODKIN, V. K.; KULESHOV, V. I; LYSHINSKIY, V. V.; MAKSIMOV, S. M.

10-DATE OF INFO
26FEB64

43-SOURCE
PATENT 169841 (884785/40-23) CLASS 42k, 20 (RUSSIAN)

68-DOCUMENT NO.
HT6700111(i)

69-PROJECT NO.
11705-74

63-SECURITY AND DOWNGRADING INFORMATION	64-CONTROL MARKINGS	97-HEADER CLASN
UNCL, 0	NONE	UNCL

76-REEL/FRAME NO.	77-SUPERSEDES	78-CHANGES	40-GEOGRAPHICAL AREA	NO. OF PAGES
1382 2073			UR	3

CONTRACT NO.	X REF ACC. NO.	PUBLISHING DATE	TYPE PRODUCT	REVISION FREQ
			Translation	None

STEP NO.
UR /0000/00/000/000/0001/0002

ACCESSION NO.
TA7001586

ABSTRACT: The essence of the invention is a proposed adjustable nozzle for wind tunnels, which incorporates a rigid plate on which the flexible section of the adjustable nozzle bears and a rectilinear profile section is formed in the terminal outlet part of the nozzle, making it possible to obtain a more uniform velocity (Mach number) field, and to further influence the flow boundary layer in the working section of the wind tunnel for a broader range of Mach numbers.

DATA HANDLING PAGE

01-ACCESSION NO.	02-DOCUMENT LOC	03-TOPIC TAGS
TA7001587		hydraulics, heat exchanger

05-TITLE A DEVICE FOR PRESS-FITTING THE ENDS OF TUBES BY HEADING OUT

07-SUBJECT AREA
20, 14

08-AUTHOR/CO-AUTHORS	10-DATE OF INFO
IVKIN, V. V.	02JUL59

09-SOURCE	60-DOCUMENT NO.
PATENT 131325 (632817/29) CLASS 7c, 21 (RUSSIAN)	HT6700111(J)
	61-PROJECT NO. 11705-70

63-SECURITY AND DOWNGRADING INFORMATION	64-CONTROL MARKINGS	97-HEADER CLASN
UNCL, O	NONE	UNCL

76-REEL/FRAME NO.	77-SUPERSEDES	78-CHANGES	40-GEOGRAPHICAL AREA	NO. OF PAGES
1882 2074			UR	3
CONTRACT NO.	**X REF ACC. NO.**	**PUBLISHING DATE**	**TYPE PRODUCT**	**REVISION FREQ**
			Translation	None

STEP NO. UR/0000/00/000/000/0001/0002 **ACCESSION NO.** TA7001587

ABSTRACT: Invention proposes a device for press-fitting the ends of tubes, especially heat exchanger tubes, into tube sheets by heading them out with a reverse-tapered punch. The object is to mechanize the operations and eliminate preliminary hot inward heading. Device is made up of a tapered spring-loaded chuck with a retaining spring collar pushed over it and bearing against the end of the working hydraulic cylinder housing, with a reverse taper passing through the chuck and expanding it as it is pulled in attached to the free end of the piston rod. A calibrated stopping device is installed on the slide-valve reverser of the working hydraulic cylinder by automating the pressure exerted by the chuck on the inside wall of the tube.

DATA HANDLING PAGE

01-ACCESSION NO.	98-DOCUMENT LOC	20-TOPIC TAGS
TA7001588		pressure measuring instrument, strain gage, pressure gage

05-TITLE A MEMBRANE-TYPE PRESSURE-MEASURING DEVICE

47-SUBJECT AREA 14

42-AUTHOR/CO-AUTHORS	10-DATE OF INFO
MAYZEL', M. B.	16JAN60
43-SOURCE PATENT 131124 (651010/26) CLASS 42k, 14_{04}; 74b, 2 (RUSSIAN)	**66-DOCUMENT NO.** HT6700111(k)
	69-PROJECT NO. 11705-70

63-SECURITY AND DOWNGRADING INFORMATION	64-CONTROL MARKINGS	97-HEADER CLASN
UNCL, 0	NONE	UNCL

76-REEL/FRAME NO.	77-SUPERSEDES	78-CHANGES	40-GEOGRAPHICAL AREA	NO. OF PAGES
1882 2075			UR	3
CONTRACT NO.	**X REF ACC. NO.**	**PUBLISHING DATE**	**TYPE PRODUCT**	**REVISION FREQ**
			Translation	None

STEP NO. UR /0000/00/000/000/0001/0002 **ACCESSION NO.** TA7001588

ABSTRACT: Invention proposes a membrane-type pressure-gauge device containing foil strain gauges. In order to improve sensitivity, two of its foil strain gauges are in the form of concentric half rings and placed at the center of the membrane. The other two strain gauges, whose turns are oriented along radii, are placed in the zone of the largest radial-stress values, i.e., near the mounting ring of the membrane.

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Union of Soviet Socialist Republics

USSR State Committee on Inventions and Discoveries

DESCRIPTION OF INVENTION TO AUTHOR'S CERTIFICATE NO. 182219

A CAPACITIVE PNEUMOELECTRIC ALTERNATING-CURRENT GENERATOR

(Yemkostnoy pnevmoelektricheskiy generator peremennogo toka)

Inventor	A.F. Golovko
Applicant	Rostov Higher Engineering Command Academy named for Chief Marshall of Artillery M.I. Nedelin
Classes	$21d^2$, 5/01
MPK [International Patent Catalog] No.	H 02n
UDC [Universal Decimal Catalog] No.	621.313.17(088.8)
Subordinated to Author's Certificate No.	–
Date of Application With attached Declaration No.	24 Jun 1965 (No. 1014691/26-25) –
Priority	–
Published	25 May 1966 in Bulletin No. 11
Publication Date of Description	3 Aug 1966
Signature Group No.	–
Published in "Byulleten' izobreteniy i tovarnykh znakov" [Bulletin of Inventions and Trademarks]	–
Pages in original	1-3

A CAPACITIVE PNEUMOELECTRIC ALTERNATING-CURRENT GENERATOR

Conversion of the energy of compressed gases into electricity presupposes the use of two separate converters: compressed-gas energy to mechanical energy and mechanical to electrical energy; this results in unsatisfactory transformation efficiency.

The generator proposed here, which represents a design combination of the above converters, simplifies the construction, reduces the size of the apparatus, and improves conversion efficiency. In it, energy is generated by variation of the mutual capacitances of fixed plates and moving insulated belts, which execute a traveling-wave motion when acted upon by gas impulses.

Figure 1 shows the design of the capacitive pneumoelectric generator; Fig. 2 shows the generator in section with the moving elements in their working position; Fig. 3 is a graphical representation of the time dependence of the mutual capacitances between the plates and the belts; Fig. 4 shows the voltage of the capacitive generator as a function of load resistance.

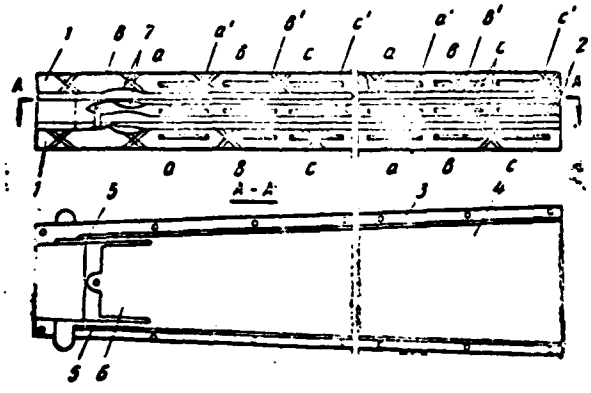
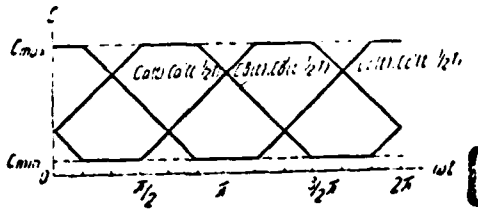


Fig. 1

Fig. 2



GRAPHIC NOT REPRODUCIBLE

Fig. 3

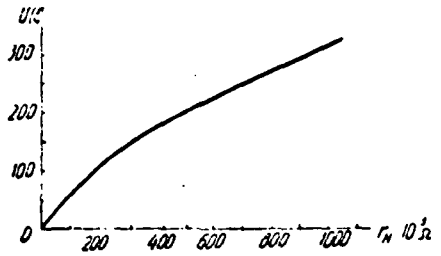


Fig. 4

The generator is a dielectric housing containing long rectangular-section passages formed by the walls 1 with the metallic plates a, b, c built into them and wall 2 with plates a', b', c', together with the side walls 3.

An elastic belt 4 covered with a layer of high-strength dielectric and secured to the passages by means of the straps 5, which act simultaneously as current leads, is placed within each passage.

The parts of the elastic belts projecting between the straps in the form of the tongues 6 perform self-oscillations in the presence of a gas flow.

This is accomplished by feeding the working gas alternately into the chambers of the passages above and below the belts. As a result, the latter will execute their traveling-wave motion.

During displacement in one direction, the tongue angles of attack do not change sign.

At the extreme positions, the angle is changed by means of the arc-shaped depressions 7. The vibrations of all tongues are synchronized by the mechanical couplers 8.

The undulating motion of the elastic belts gives rise to periodic variation of the mutual capacitances between the fixed plates and the elastic belts (Fig. 3). To obtain electric power, it is necessary to supply an excitation voltage to the elastic belts and to connect a load to the parallel-connected fixed plates.

When the length of the traveling wave is three times that of the

fixed plates, the voltages across loads connected to plates a-a', b-b' and c-c' will be time-shifted by 120°, i.e., they form a three-phase system.

Object of Invention

1. Capacitive pneumoelectric alternating-current generator, in which the energy of compressed gases is converted into electricity by mechanical variation of the mutual capacitances between separate similarly charged parts of the machine, *characterized* by the fact that, with the purpose of improving the utilization of the compressed-gas energy, it is made in the form of longitudinal rectangular-section channels whose walls are fixed insulated plates, while the moving part takes the form of insulated belts placed inside the passages and executing a traveling-wave motion under the action of gas impulses.

2. Generator according to point 1, *characterized* by tongue-type gas distributors mounted at the entries into the passages and performing self-oscillations under the influence of aerodynamic forces.

Manuscript Page No.

[Transliterated Symbols]

2 н = n = nagruzka = load

Union of Soviet Socialist Republics

USSR State Committee on Inventions and Discoveries

DESCRIPTION OF INVENTION TO AUTHOR'S CERTIFICATE NO. 182402

A TERNARY LOGIC CIRCUIT

(Troichnaya logicheskaya skhema)

Inventors	Yu.L. Ivas'kiv and A.S. Il'inykh
Applicant	USSR Academy of Sciences Institute of Cybernetics
Classes	42m, 14/02
MPK [International Patent Catalog] No.	G 06f
UDC [Universal Decimal Catalog] No.	681.142.07(088.8)
Subordinated to Author's Certificate No.	–
Date of Application With attached Declaration No.	06 Nov 1964 (No. 928192/26-24) –
Priority	–
Published	25 May 1966 in Bulletin No. 11
Publication Date of Description	16 Jul 1966
Signature Group No.	–
Published in "Byulleten' izobreteniy i tovarnykh znakov" [Bulletin of Inventions and Trademarks]	–
Pages in original	1-3

A TERNARY LOGIC CIRCUIT

Ternary logic circuits containing transistors with different types of conductivity are known.

The circuit proposed here is distinguished by the fact that a tristable threshold tunnel-diode pair is connected at its input.

This increases the reliability and logical potentialities of the system.

Figure 1 shows a circuit with three stable states; Fig. 2 shows the volt-ampere characteristic of the tunnel-diode pair, which has the following characteristic segments: *AB*, *CD*, *DE* and *FG* with positive resistances and *BC* and *EF* with negative resistances.

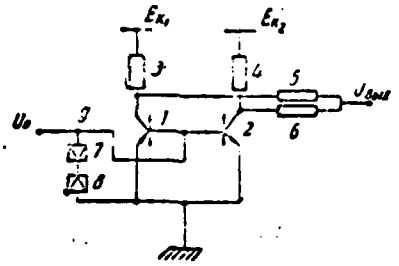


Fig. 1

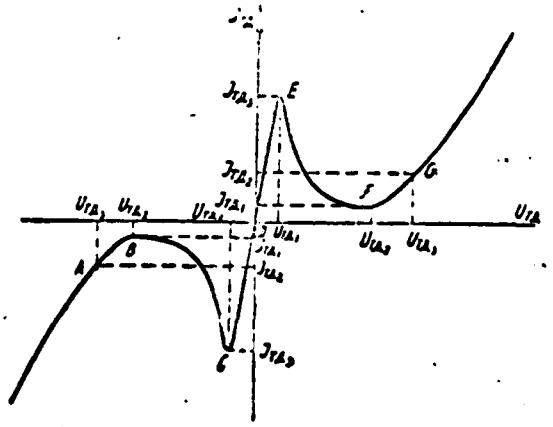


Fig. 2

The circuit contains transistor 1 (p-n-p c nductivity) and transistor 2 (n-p-n conductivity), resistances 3 and 4 in the collector circuits, the coupling resistances 5 and 6, and the two counterconnected tunnel diodes 7 and 8.

The supply voltages are denoted by E_{k_1} and E_{k_2}.

The circuit operates as follows.

As follows from the characteristic shown, the operation of the circuit containing two tunnel diodes connected in series and opposed is characterized by the following regimes:

Regime 1 is characterized by the fact that for values of the current through the tunnel diodes

$$I_{TD} < I_{TD_m}$$

the voltage (U_d) at point 9 of the circuit does not exceed the value of U_{TD_1}, which is of the order of tens of millivolts, and varies insignificantly with variation of I_{TD}.

The characteristic segments CD and ED correspond to this regime.

Regime 2 is characterized by the fact that for values of the current through the tunnel diodes

$$I_{TD} > I_{TD_m}$$

the operating point on the characteristic moves jumpwise onto a segment with positive resistance (FG if $I_{TD} > 0$, and AB if $I_{TD} < 0$).

In this case, the voltage U_d at point 9 is found to be larger than U_{TD} and is of the order of several hundred millivolts.

When a signal of the order of a few volts (which corresponds to actual operating conditions with semiconductor elements) is applied to the circuit input, the voltage $U_d > U_{TD}$ is established at point 9, one of the transistors (T_1 or T_2) is blocked and the signal U_{vykh} is of the order of a few volts.

When signals whose magnitude is determined by the zero drift of the circuit output signal are applied at the circuit input, the voltage U_d at point 9 is found to be such that $U_d < U_{TD}$, and in this case the signal at the circuit output has zero potential accurate to tenths of a millivolt.

Thus, when circuits with three stable states, based on semiconductor devices with different conductivity types and containing a pair of tunnel diodes connected in series and opposed at the input are connected in series, no amplification of the signal resulting from zero drift in one of the stages occurs in subsequent stages. This makes it possible to construct circuits of practically any desired degree of complexity.

The zero-potential drift of a semiconductorized circuit using different conductivity types is determined by the specific conditions of its operation: collector voltage instability, scatter of circuit-element parameters, and the influence of temperature. This magnitude determines the types of tunnel diodes selected. Here, the following requirements are laid down for their characteristics: the peak voltage U_{TD} must exceed the drift of zero potential that is possible under the circuit operating conditions in question.

The circuit proposed is simple and reliable, and can perform logical operations that form a complete system of logical operations – inverse AND and inverse OR.

For example, the high potential is denoted by "2," the low potential by "1," and zero potential by "0."

If the amplitude of each of the input signals x, y ensures the condition

$$(I_{TD})_{ax} > I_{TD_0},$$

we obtain

x	y	OR
1	1	2
1	0	2
1	2	2
0	1	2
0	0	1
0	2	1
2	1	1
2	0	1
2	2	1

If the condition $(I_{TD})_{vkh} > I_{TD_3}$ is satisfied by combined action of the signals x, y, we obtain

x	y	OR
1	1	2
1	2	0
1	2	0
0	1	0
0	0	0
0	2	0
2	1	0
2	0	0
3	2	1

Object of Invention

Ternary logic circuit built around transistors with different conductivity types and grounded emitters, with a base-emitter junction serving as its input, *characterized* by the fact that a network of two tunnel diodes connected in series and opposed is connected at its input.

Manuscript Page No.	[Transliterated Symbols]
1	к = k = kollektor = collector
1	ТД = TD = tunnel'nyy diod = tunnel diode
1	д = d = diod = diode
1	вых = vykh = vykhod = output
3	вх = vkh = vkhod = input

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DESCRIPTION OF INVENTION TO AUTHOR'S CERTIFICATE NO. 182407

AN ANALOG-TO-DIGITAL CONVERTER

(Analogo-tsifrovoy preobrazovatel')

Inventors	D.Kh. Kisets and V.I. Ivanov
Applicant	–
Classes	42m, 14/03
MPK [International Patent Catalog] No.	G 06f
UDC [Universal Decimal Catalog] No.	681.142.07(088.8)
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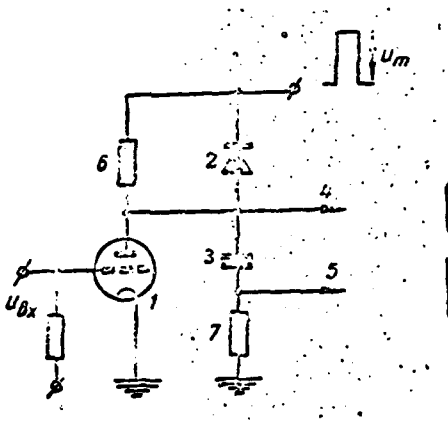
Pages in original	1-2

AN ANALOG-TO-DIGITAL CONVERTER

Known analog-to-digital converters contain a nonlinear two-terminal network, for example, a diode or triode working with reverse bias and bracketed by capacitance feedback.

Although they are highly precise, their circuits are complex. The converter described here has a simpler circuit. Its accuracy is sufficient for use as, for example, a telemetry-system unit. The converter may be of either the vacuum-tube or transistor type. The circuit's operation is based on the use of a nonlinear semiconductor two-terminal network working with a back-biased *p-n* junction on the segment of the volt-ampere characteristic corresponding to negative resistance. The circuit uses an amplifier stage whose input is connected to the source of the voltage to be converted, while its output is connected to the common point of the capacitance and the nonlinear two-terminal network.

The drawing shows the schematic diagram of the converter (vacuum-tube version).



Electron tube 1 is connected as a linear amplifier. The dc voltage U_{vkh}, whose magnitude is subject to conversion, is applied to the tube grid. A rectangular pulse that provides for displacement of the diode operating point in the reverse direction and has a duration calibrated for the maximum possible signal for conversion is applied to diode 2. The pulse amplitude U_m corresponds to the onset of generation (negative resistance on the volt-ampere characteristic of the diode's back-biased *p-n* junction). On simultaneous action of U_{vkh} and U_m, the first generation peak, which corresponds in time to the leading edge of the triggering pulse, is shunted by capacitor 3. Then, shunting the tube load of the diode, the capacitance instantaneously shifts it to the heavy-

current regime. Since the resistance of the diode is small at this time, capacitor 3 can charge within a very short time almost to the full amplitude of the triggering pulse. Here a positive potential appears on the plate connected to the diode and returns the diode into the region of small voltages and currents. This is followed by discharge of capacitor 3 across the tube load. The discharge time is proportional to the tube resistance, which varies linearly as a function of the input voltage U_{vkh}. The capacitor discharges to a voltage whose difference from the triggering-pulse amplitude is capable of returning the diode to the "heavy-current" mode. This process is repeated many times as long as there is a triggering pulse. The repetition frequency and, consequently, the duration and number of output pulses are linear functions of the input-signal amplitude in operation on the linear segment of the plate-grid characteristic of the tube. Thus, the linear conversion formula may be written:

$$n \cdot k = U_{vkh},$$

where n is the number of pulses at the output; k is a coefficient of proportionality.

Two outputs, 4 and 5, may be provided.

The pulse voltage amplitude at output 4 is almost equal to the triggering amplitude U_m, while the current is determined by the tube internal resistance and the load resistance into the signal current output, which is characterized by a small voltage, but a large current and short duration.

The resistance 7 in the circuit of capacitor 3 is made small when a semiconductor device of low capacity is used as the nonlinear two-terminal network.

Its rating is 0.1-10 ohms.

A diode may be replaced by a transistor, connected as a diode in accordance with the high breakdown voltage.

It is preferable to use switching diodes or transistor junctions having high breakdown voltages as nonlinear two-terminal networks, since they are well-matched to the plate-supply regime of the electron tubes. The tube may be either a triode or a pentode.

Object of Invention

Analog-to-digital converter containing a nonlinear two-terminal network, for example a diode or a triode connected as a diode, working with back bias and covered by capacitive feedback, *characterized* by the fact that, with the purpose of simplifying the device, a linear amplifier is used as the load of the nonlinear two-terminal network, with the amplifier input connected to the source of the voltage to be converted, while its output is connected to the common point of the capacitor and the nonlinear two-terminal network.

Manuscript Page No.	[Transliterated Symbols]
1	ВХ = vkh = vkhod = input

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DESCRIPTION OF INVENTION TO AUTHOR'S CERTIFICATE NO. 182766

A RELAXATION OSCILLATOR WITH AN LC RESONANT CIRCUIT

(Relaksatsionnyy generator s rezonansnym LC-konturom)

Inventors	I.V. Nezhdanov and V.S. Moin
Applicant	–

Classes	$21a^1$, 36/02
MPK [International Patent Catalog] No.	H 03k
UDC [Universal Decimal Catalog] No.	621.373.431.2(088.8)
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Pages in original	1-2

A RELAXATION OSCILLATOR WITH AN LC RESONANT CIRCUIT

Relaxation oscillator circuits using an LC resonant network and a thyristor (silicon controlled rectifier) are known. In these generators, frequency stability is determined basically by the stability of the LC-network parameters. However, the presence of the diode in the charging circuit renders the pulse repetition frequency somewhat unstable due to the introduction of a nonthermostable nonlinear resistance into the circuit. Moreover, such a relaxation oscillator has poor dependability because of the presence of the additional diode and the impossibility of providing a standby for each thyristor element without incurring a substantial weight and bulk penalty in the apparatus as a whole. The presence of galvanic coupling through the thyristor input circuit and its direct control of the circuit current render it impossible in the general case to match the wave impedance of the circuit to the impedance of the thyristor input circuit. This results in deterioration of the frequency stability of the relaxation oscillator.

The relaxation oscillator proposed here differs from the known types in that a pulse transformer is used in it instead of the diode in the thyristor control circuit. This has made it possible to improve frequency stability and increase the power of the generated pulses. To improve reliability, reserve thyristors are used, with their control electrodes connected to separate secondary windings of the pulse transformer.

The schematic diagram of the subject relaxation oscillator is shown in Fig. 1; Fig. 2 shows the element-for-element backup thyristor system.

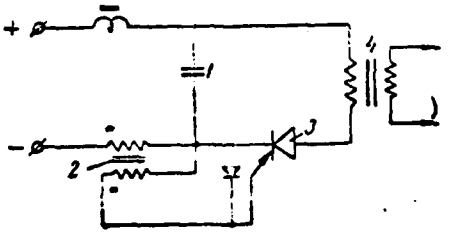

Fig. 1

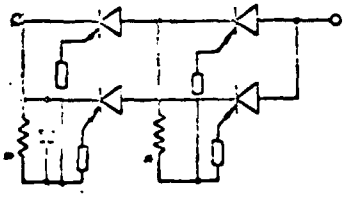

Fig. 2

The oscillator works as follows.

When the dc voltage is applied, the resonance discharge process of capacitor 1 begins. When the voltage across the capacitor has reached its maximum value, the capacitor's discharge process begins

across the power source and simultaneously a voltage is applied to the primary of transformer 2 and, transformed into the secondary winding, tends to switch in thyristor 3. When the circuit current has increased to a certain magnitude, the thyristor is switched in and the voltage from the capacitor is applied to pulse transformer 4, which is coupled with the load. A high-frequency capacitor recharging process takes place in the relaxer, and the corresponding pulses go into the load. The pulse width is determined by the capacitance of the capacitor, the load parameters, and the primary inductance of the pulse transformer.

After termination of the high-frequency capacitor recharging process, thyristor 3 is switched out and the capacitor begins to charge.

Since the frequency of the capacitor recharging process is far in excess of the LC-circuit resonant frequency, the capacitor charging process takes place for all practical purposes with zero initial conditions, and the pulse repetition rate depends only slightly on the load parameters.

Transformer 2 is made in the form of a peak transformer, and its resistance in the capacitor-charging process is negligibly small. The transformation ratio of the device is selected on the basis of obtaining maximum relaxer stability.

The relaxation oscillator proposed here makes it possible to provide element-for-element backups for the thyristors, for example, by using the circuit shown in Fig. 2, and makes possible a considerable increase in stability and in the power of the pulses generated.

The generator can be used in automatic systems and pulsed systems when it is necessary to obtain short powerful pulses at a high repetition frequency and with high stability through variation of the ambient conditions affecting the oscillator.

Object of Invention

1. Relaxation oscillator with LC resonant circuit, containing a thyristor, a diode and a pulse transformer, *characterized* by the fact that, with the purpose of improving frequency stability and increasing generated pulse power, the primary winding of the pulse transformer is connected in series with the LC circuit, while its secondary winding is series-connected into the circuit of the thyristor control electrode.

2. Oscillator according to point 1, *characterized* by the fact that, in order to improve reliability, additional thyristors are used, with their control electrodes connected to separate secondary windings of the pulse transformer.

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DESCRIPTION OF INVENTION TO AUTHOR'S CERTIFICATE NO. 182767

A PULSE STRETCHER

(Rasshiritel' impul'sov)

Inventors	Z.V. Magrachev, B.K. Tsygankov and V.Ya. Yegupov
Applicant	Electrical Instrument Works
Classes	$21a^1$, 36/04, $21a^4$, 71
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Publication Date of Description	3 Aug 1966
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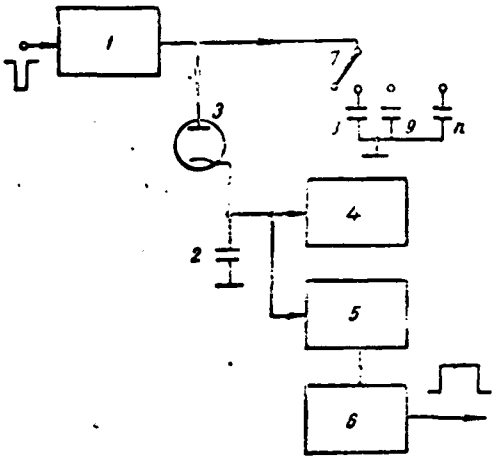
Pages in original	1-2

A PULSE STRETCHER

Pulse stretchers for digital pulse-length meters containing an input charging-current stabilizer are known. The stabilizer output is connected to the plate of a diode between whose cathode and "ground" there is a storage capacitor, which is connected to the discharge-current stabilizer and the amplitude comparator. When the measurement ranges are switched in these instruments, it is necessary, in order to obtain the same measurement error in all ranges, to change the charging current or the storage capacitor, with a simultaneous change in the filling-pulse counting rate, i.e., the operating regime of the instrument must be changed.

The pulse stretcher proposed here differs from the known types in that additional capacitors are included between the diode plate and "ground" across the range switch. This makes it possible to maintain the same instrument operating regime when the ranges of measurement are changed.

The drawing shows a block diagram of the proposed instrument.



The pulse to be measured is fed to the charging-current stabilizer 1. During action of the pulse, the storage capacitor 2 is charged across the decoupling diode 3 by the stabilizer direct current. The increase in the voltage across the capacitor is proportional to the duration of the input pulse. At the end of the pulse to be measured, the diode closes and the capacitor is discharged slowly by the direct current of the discharge-current stabilizer 4. The discharge time is directly proportional to the voltage increment acquired by the capacitor and, consequently, to the duration of the pulse. At the beginning

of charging and the end of discharging of the capacitor, sharp-peaked pulses appear at the output of amplitude comparator 5 and are fed to the shaping device 6, which puts out a rectangular pulse whose duration is equal to the time interval between the sharp-peaked pulses.

The coefficient of pulse widening (the ratio of the duration of the pulse at the shaping-device output to the duration of the measured pulse) is determined by the expression

$$K = \frac{I_1}{I_2},$$

where I_1 is the capacitor charging current; I_2 is the capacitor discharge current.

The width of the pulse taken from the output of unit 6 is measured by the digital meter.

For measurements in another range of pulse duration, one of the additional capacitors 8, 9, ..., n is connected across selector 7. The charging rate of capacitor 2 will then be reduced. At the end of the input pulse, the additional capacitor discharges through the charging-current stabilizer and has no influence on the discharging process of capacitor 2.

Thus, the duration of the stretcher output pulse varies within the same limits in each of the ranges.

The pulse-widening coefficient is varied by varying the total capacitance of the capacitors during the charging process. The widening coefficient is then determined by the expression

$$K = \frac{I_1}{I_2} \cdot \frac{C_n}{C_n + C_d},$$

where C_n is the storage-capacitor capacitance; C_d is the capacitance of the additional capacitor.

The parameters of the other elements in the instrument remain unchanged when the range of measurement is switched.

Object of Invention

Pulse stretcher for a digital pulse-width meter, containing an input charging-current stabilizer to whose output is connected the plate of a diode between whose cathode and "ground" a storage capacitor is inserted and connected to the discharge-current stabilizer and amplitude comparator, *characterized* by the fact that, with the purpose of ensuring constancy of the instrument's operating mode when ranges of measurement are switched, additional capacitors are connected between the diode plate and "ground" through the range selector switch.

Manuscript Page No.	[Transliterated Symbols]
2	н = n = nakopitel'nyy = storage
2	д = d = dopolnitel'nyy = additional

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DESCRIPTION OF INVENTION TO AUTHOR'S CERTIFICATE NO. 182988

DEVICE FOR HERMETIC JOINING OF TWO PIPES

(Ustroystvo dlya germetichnogo soyedineniya dvukh truboprovodov)

Inventors	Zh.P. Akhromeyev and V.I. Nyrkov
Applicant	–
Classes	47f, 12
MPK [International Patent Catalog] No.	F 06ℓ
UDC [Universal Decimal Catalog] No.	621.643.416(088.8)
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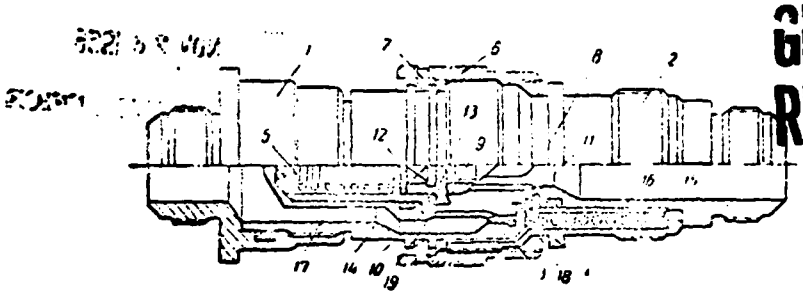
Pages in original	1-2

DEVICE FOR HERMETIC JOINING OF TWO PIPES

Devices for hermetic joining of two pipes, made in the form of end fittings mounted on the pipes and equipped with built-in spring-loaded gate valves to seal the pipes when they are disconnected and connected by means of a captive nut.

To relieve the threaded joint of the internal-pressure forces, the device described here is provided with a hermetic relieving chamber, which is located in one of the end fittings and bounded by a cylinder coaxial with the fitting body and by the gate-valve rod. To ensure tightness of the end fittings, W-shaped grooves with rubber vulcanized into them are made in the gate valves.

The device described is shown in the drawing.



The device for hermetic connection of two pipes consists of the end fittings 1 and 2, which are secured to the pipe sections to be joined, the gate valves 3 and 4, the hermetic chamber 5 in end fitting 1, and the captive nut 6 with sleeve 7, which is used in manual connecting and disconnecting of the pipes.

In the disconnected state, the end fittings are closed by the gate valves, in which the knife rings 8 and 9 are pressed against the rubber packings in grooves 10 and 11.

In its interaction with the knife ring, the W-groove presses the rubber vulcanized into the groove and seals the connection. In automatic or manual connecting of the pipes, the two end fittings are centered on one another along surface 12 of the projection 13 of fitting 2 and the rod 14 of fitting 1. As the fittings move together, overcoming the resistance of spring 15 and the liquid in fitting 2, fitting 1 shifts plunger 16 toward the right and fitting 2, overcoming the resistance of spring 17 and the liquid in fitting 1, moves rod 14 to the left.

When joining of the pipes has been completed, sealing of the joint is provided by the interaction of knife 18 with the packing in

groove 11 and knife 19 with the packing in groove 10. The hermetic chamber 5 lowers the hydrostatic forces that tend to push fittings 1 and 2 apart, by reducing the area acted upon by the fluid pressure when the pipelines are joined.

The device described here makes it possible to simplify the construction of hydraulic systems and improve their operating reliability, as well as to connect pipelines carrying working fluids under high pressures.

Object of Invention

1. Device for hermetic joining of two pipelines, made in the form of end fittings secured to the pipelines, these fittings being provided with built-in spring-loaded gate valves to close the pipelines when they are disconnected and connected with one another using a captive nut, *characterized* by the fact, with the purpose of relieving the threaded joint of internal pressure forces, the device is provided with a hermetic relieving chamber in one of the end fittings, this chamber being bounded by a cylinder coaxial with the body of the fitting and by the gate-valve stem.

2. Device according to point 1, *characterized* by the fact that with the purpose of sealing the end fittings, W-shaped grooves with rubber vulcanized into them are made in the gate valves.

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DESCRIPTION OF INVENTION TO AUTHOR'S CERTIFICATE NO. 172400

A LASER GYROSCOPE WITH QUARTZ RESONATOR

(Lazernyy giroskop s kvartsevym rezonatorom)

Inventors	M.S. Slashchin and Ye.I. Kuz'min
Applicant	–
Classes	21f, 90, 42c, 32_{10}
MPK [International Patent Catalog] No.	H 03b, G 01c
UDC [Universal Decimal Catalog] No.	621.375.8:62-752.4(088.8)
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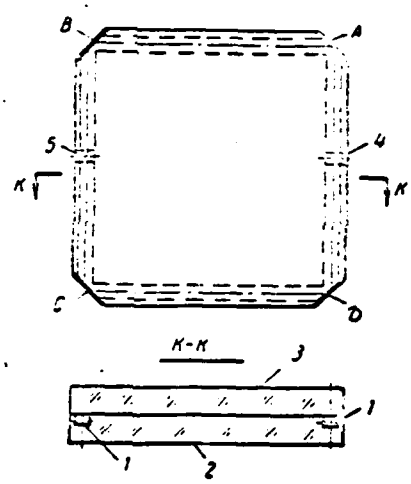
Pages in original	1-2

A LASER GYROSCOPE WITH QUARTZ RESONATOR

In known laser gyroscopes, the construction of the resonators that they incorporate has inadequate rigidity properties, and this imposes limits on the sensitivity and stability of the gyroscopes.

The invention proposes a laser gyroscope in which rigidity is ensured by making the resonator of two joined quartz plates with quartz mirrors bonded onto them.

The drawing presents a diagram of a quartz laser gyroscope with a sectional view through *K-K*.



The light beam is reflected from mirrors *A*, *B*, *C*, *D* and passes along cavity 1 of the resonator, which is formed from the two joined quartz plates 2, 3. Holes 4 and 5 in the plates are for bonding in the electrodes, evacuating air and filling the resonator volume with the working gas.

Object of Invention

Quartz-resonator laser gyroscope, *characterized* by the fact that, in order to ensure rigidity of the laser gyroscope, the resonator is formed from two joined quartz plates with quartz mirrors bonded onto them.

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DESCRIPTION OF INVENTION TO AUTHOR'S CERTIFICATE NO. 171613

DEVICE FOR SIMULATION OF AERODYNAMIC LOAD ON COMPONENTS OF AN AIRCRAFT

(Ustroystvo dlya imitatsii aerodinamicheskoy nagruzki na organy letatel'nogo apparata)

Inventors	V.K. Pikalov, A.G. Gusev, V.D. Altukhov, M.A. Kulepov, V.I. Mamonov and N.V. Mukhin
Applicant	USSR State Committee Organization on Aeronautical Engineering
Classes	42k, 21_{01}
MPK [International Patent Catalog] No.	G 01m
UDC [Universal Decimal Catalog] No.	620.178(088.8)
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Pages in original	1-2

DEVICE FOR SIMULATION OF AERODYNAMIC LOAD ON COMPONENTS OF AN AIRCRAFT

Rubber cables with one end attached to the test object and the other to a stationary part of the scaffolding and rope systems in which one end of the rope is secured to the test object, while the other is thrown over a fixed pulley and connected to a counterweight block or a hydraulic power cylinder, are used to simulate aerodynamic loads on landing-gear doors, struts, etc., in static testing.

Apart from being cumbersome, such systems have an essential shortcoming: the arm at which the applied force acts varies over the travel of the object being tested, and this makes it impossible to use these systems to test objects with large deflection angles; it also requires complex systems to satisfy the necessary law of force variation over the object's travel.

The invention proposes a device for simulation of aerodynamic load on elements of an aircraft such as landing gear doors and struts, etc., in the course of static testing. The device consists of a frame with drums and suspension elements and a loading system with a cylinder, beam, ropes and straps. The axis of the frame suspension elements coincides with the rotation axis of the object being tested. The frame of the loading-strap system is attached to the test object, and the cables run over drums to the beam and loading cylinder.

The drawing presents a schematic diagram of the apparatus.

The drums 2 and ropes 3 are rigidly attached to frame 1. The other ends of the ropes are secured to beam 4, to which the loading cylinder 5 is attached. The test object 7 and its lower-retract device 8 are loaded from the frame through the system of loading straps 6. The rotation axis of the frame coincides with that of the test object.

Bracket 9, which has several holes for connection to the lever system and straps, is provided on the frame to improve standardization and to provide for the necessary direction of the aerodynamic force being simulated. Multigroove drums with various diameters can be mounted on the frame.

The arm h at which the simulated aerodynamic force is applied remains constant as the test object is rotated; hence it becomes possible to produce any law of variation of the aerodynamic load on the test object.

Object of Invention

Device for simulation of aerodynamic load on components of an aircraft, usually control surfaces, ailerons, and landing gear doors, incorporating a frame with drums and suspension assemblies and a load-

ing system with a cylinder, beam, ropes and straps, *characterized* by the fact that, with the purpose of loading test objects that deflect through large angles and simplifying adjustment of the simulated force applied, the axis of the frame suspension units is placed in coincidence with the rotation axis of the test object, with the frame connected by a system of loading straps and the test object and ropes via drums to the beam and loading cylinder.

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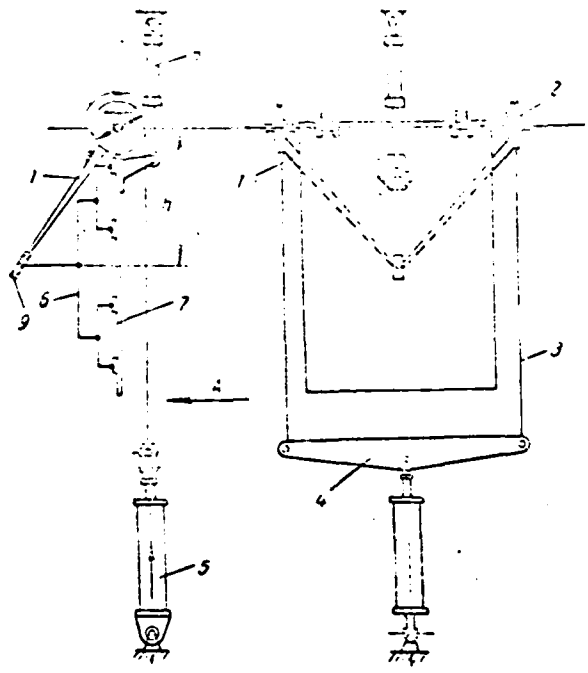

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DESCRIPTION OF INVENTION TO AUTHOR'S CERTIFICATE NO. 169841

AN ADJUSTABLE WIND-TUNNEL NOZZLE

(Reguliruyemoye sopl dlya aerodinamicheskikh trub)

Inventors	V.I. Kuleshov, V.V. Lychinskiy, S.M. Maksimov and V.K. Solodkin
Applicant	USSR State Committee Organization on Aeronautical Engineering
Classes	42k, 20
MPK [International Patent Catalog] No.	G 01m
UDC [Universal Decimal Catalog] No.	620.178(088.8)
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Signature Group No.	172
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Pages in original	1-2

AN ADJUSTABLE WIND-TUNNEL NOZZLE

Known adjustable wind-tunnel nozzles with a rigid inlet section that traverses under the action of two drives and a flexible outlet section that forms the curvilinear part of the nozzle with the aid of two or three drives are capable of delivering satisfactory working-fluid flow uniformity only in a narrow range of Mach numbers (M_{as} = ±0.2-0.3). This result cannot be obtained over a broader range of Mach numbers (from subsonic to M = 3.5-4) because the contour of the supersonic nozzle consists of two parts on the flexible outlet section: a curvilinear part with nonzero curvature and a rectilinear part whose length is a function of Mach number. Obviously, it is impossible to bend the plate with 2 or 3 drives in such a way that the radius of curvature and, consequently, the bending moment will be zero on one part of it and nonzero on another part.

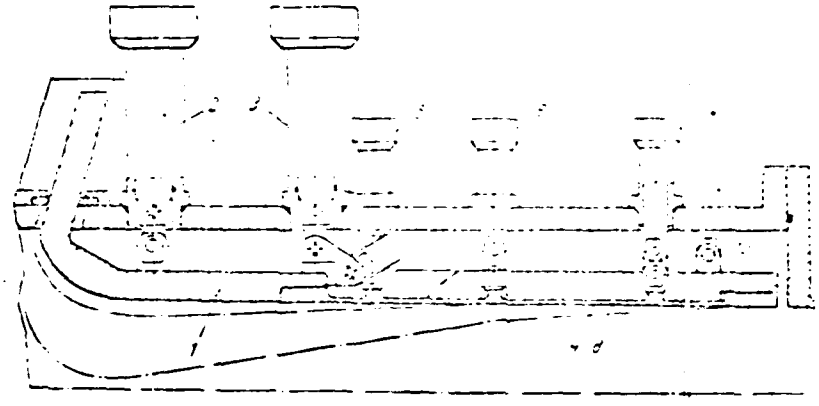
The essence of the invention consists in the fact that the proposed adjustable nozzle, which incorporates a rigid plate on which the flexible section of the adjustable nozzle bears and by means of which a rectilinear profile section is formed in the terminal outlet part of the nozzle, makes it possible to obtain a more uniform velocity (Mach number) field and, further, to account for the influence of the flow boundary layer in the working section of the wind tunnel for a broader range of Mach numbers.

The nozzle profile in the vertical plane of the section is formed with the aid of five drives mounted on the rigid surface of the wind tunnel, whose rigid inlet section is hinged to one drive and bears against the hinged receptacle in the other drive. The flexible outlet section is hinged to two drives and rigidly connected to another. The end of the flexible outlet section of the nozzle is rigidly attached to a support plate, the end of which is joined to the rigid surface of the wind tunnel in such a way that it can move about the horizontal axis. The support plate provides a rectilinear section at the end of the flexible part of the nozzle either parallel or at an angle to the wind-tunnel axis by means of one drive, and curvature of the initial section of the flexible nozzle part is provided with two drives.

The essentials of the invention are illustrated by the drawing, which shows the adjustable wind-tunnel nozzle.

The nozzle consists of the rigid inlet section 1 with drives 2 and 3, and the flexible outlet section 4 with drives 5, 6 and 7. The part of the flexible outlet section whose curvature must be zero, bears against the rigid plate 8, which is mounted on the tunnel housing 9 in such a way that corrections can be introduced for the thickness of the boundary layer in both subsonic and supersonic work with the nozzle. This is brought about by turning the rigid plate on axle 10.

GRAPHIC NOT REPRODUCIBLE



Object of Invention

Adjustable nozzle for wind tunnels with rigid inlet and flexible outlet sections, *characterized* by the fact that, with the purpose of obtaining a more uniform Mach-number field with correction for boundary-layer thickness, it incorporates a rigid plate to form the rectilinear section of the flexible wall and its supports.

Manuscript Page No.

[Transliterated Symbols]

1 pacч = rasch = raschetnyy = design(ed)

Union of Soviet Socialist Republics

USSR State Committee on Inventions and Discoveries

DESCRIPTION OF INVENTION TO AUTHOR'S CERTIFICATE NO. 131325

A DEVICE FOR PRESS-FITTING THE ENDS OF TUBES BY HEADING OUT

(Ustroystvo dlya opressovki kontsov trubok putem vysadki ikh naruzhu)

Inventor	V.V. Ivkin
Applicant	–
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A DEVICE FOR PRESS-FITTING THE ENDS OF TUBES BY HEADING OUT

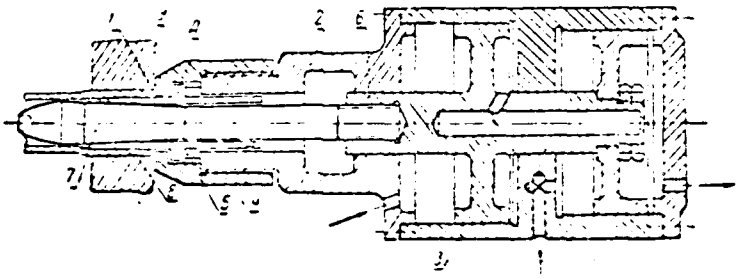
Various methods, and the corresponding devices, are known for press-fitting the ends of tubes into tube sheets, usually of heat exchangers, including devices with reverse-tapered punches.

However, all known devices and fixtures are subject to one or more disadvantages: the use of considerable manual work, inadequate productivity, the necessity of preheating the ends of the tubes and heading them in, inadequate reliability of the press fit, and so forth.

The device proposed here eliminates these shortcomings and provides for mechanization of most processes involved in press-fitting the tube ends.

Installation of a calibrated stop on the working-cylinder slide-valve reverser makes it possible to automate control of the pressure on the inside walls of the tubes as a function of wall thickness and tube quality.

The device consists of a spring taper chuck with a loaded limiter ring pushed on over it. A reverse-tapered rod coupled to the rod of the working hydraulic cylinder is placed in the chuck.



The drawing presents the general appearance of the device described. The extra-long six-jaw chuck 1, which has a tapered internal surface, is placed in the front cover 2 of the working hydraulic cylinder 3 and secured by nut 4. The outer cylindrical surface of the chuck has a shoulder *A* whose face surfaces move between contact with nut 4 on one side and, on the other, with the face surface of the loaded retainer ring 5, which is slipped on over the chuck and keeps it compressed at all times.

As the hydraulic cylinder rod 6 moves to the right, the tapered rod 7, which is rigidly connected to the cylinder rod, moves in the same direction, thus expanding the chuck. The chuck, in turn, expands the tube 8 and press-fits it to the surface of the hole in the tube

sheet 9.

The chuck is held in position by its shoulder *A*, which bears against nut 4 and the projection face of the cylinder front cover.

To regulate the pressure of the chuck on the inside surface of the tube, the slide-valve reverser of the hydraulic cylinder is fitted with a calibrated stopping device that automatically changes the piston's direction of motion and hence that of the rod and taper.

When the tapered rod has reached its extreme left-hand position, the chuck, compressed by spring collar 5, is pulled easily out of the tube as the entire device is retracted to the right.

The device described here ensures constant strength and tightness of the fit over the entire depth, and also raises labor productivity considerably.

Object of Invention

1. Device for press-fitting the ends of tubes, especially heat-exchanger tubes, into the tube sheets by heading them out with a reverse-tapered punch, *characterized* by the fact that, with the object of mechanizing the operations and eliminating preliminary hot inward heading, it is made in the form of a tapered spring-loaded chuck with a retaining spring collar pushed over it and bearing against the end of the working hydraulic cylinder housing, with a reverse taper passing through the chuck and expanding it as it is pulled in attached to the free end of the piston rod.

2. Device according to point 1, *characterized* by the fact that, with the object of automating the pressure exerted by the chuck on the inside wall of the tube, a calibrated stopping device is installed on the slide-valve reverser of the working hydraulic cylinder.

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DESCRIPTION OF INVENTION TO AUTHOR'S CERTIFICATE NO. 131124

A MEMBRANE-TYPE PRESSURE-MEASURING DEVICE

(Ustroystvo dlya izmereniya davleniya membrannogo tipa)

Inventor	M.B. Mayzel'
Applicant	–
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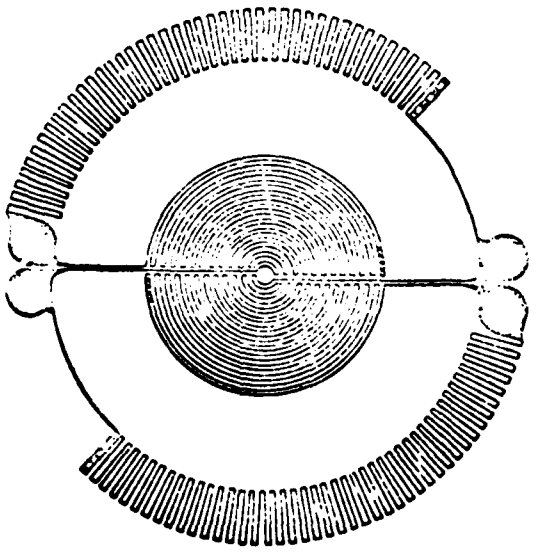
A MEMBRANE-TYPE PRESSURE-MEASURING DEVICE

Wire and foil strain gauges bonded to a membrane are used to measure pressures. The sensitivity of such pressure gauges is usually determined experimentally, by calibration.

With the purpose of increasing the sensitivity of membrane-type pressure gauges and devising a simple method for calculating it, the device proposed here consists of four strain-gauge foils and is designed for bonding to a flat round membrane. Two of the transducers are placed in the center of the membrane, in the region of the largest positive tangential-stress values. The turns of these strain gauges are given the form of concentric semicircles. These transducers are sensitive to tangential deformations. The two other transducers are placed near the mounting rim of the membrane, in the region where the radial deformations have their largest negative values, and their turns are oriented along radii. The transducers are placed in the zones in which the variation of stresses on the surface of the membrane may be regarded in approximation as linear along its radius. In the zone of small values and sign change of the tangential and radial stresses ($0.5 < i < 0.8$), there are no strain-gauge transducers (i is the ratio of the current radius of the membrane to the largest radius).

The device proposed permits sensitivity calculations for the pressure gauge on the basis of the well-known formulas for the design of bridge circuits and the functional relationships for determining the tangential and radial stresses on the membrane surface.



The drawing shows the proposed configuration of the device on an enlarged scale.

It has been established by experiment that the device has a sensitivity three times that of wire strain-gauge bridges.

Object of Invention

Membrane-type pressure-gauge device containing foil strain gauges, *characterized* by the fact that, in order to improve sensitivity, two of its foil strain gauges are made in the form of concentric half rings and placed at the center of the membrane, while two other strain gauges, whose turns are oriented along radii, are placed in the zone of the largest negative radial-stress values, i.e., near the mounting ring of the membrane.